Distributed Utility Integration Test

The Distributed Utility Integration Test (DUIT) is the first full-scale, integration test of commercial-grade, utility grid interactive Distributed Energy Resources (DER) in the United States. DERs are small modular generation and storage devices such as fuel cells, microturbines, photovoltaics and batteries that can be integrated into the utility electric system. Used in concert with the grid, DERs can lead to some or all of the following: lower energy bills/cost-of-service, superior service quality, high value energy services, and reduced environmental impacts. DUIT addresses a key technical issue: electrical implications of operating multiple, diverse DERs at high penetration levels within a utility distribution system.

DUIT is the next step in assuring the safe, reliable, and cost-effective inclusion of DER into the electric systems of the future. The goal is to advance the state of the art for DER integration practices and strategies. Other key objectives include a better understanding of the benefits and challenges associated with substantial DER penetration into the electric distribution system and gathering and analyzing data needed to characterize the actual value of DERs to ratepayers and to utilities.

Results and lessons learned from DUIT are expected to accelerate market acceptance of DERs by providing

- a testing ground for observing and measuring interactions between DERs and the electricity distribution system
- knowledge needed to eliminate a key technical barrier to use of DERs as part of the power grid, demonstrating that DERs can operate in concert with the grid safely
- knowledge needed to quantify key benefits from integrating diverse DERs with utility distribution systems
- data regarding viability of DERs connected on the customer side of the meter

Stakeholder Benefits

Consumers

Consumers expect cost-effective electric systems that are safe, reliable, problem-free, and impose little or no damage to the environment. DUIT will enhance consumer confidence in distributed generation and storage technologies by demonstrating a mix of traditional and emerging DER technologies working together, in ways needed to provide the desired benefits.

DER Developers

Participating DER developers will acquire a better understanding of how their products work with the grid and other DERs. Developers will learn the utility perspective and how it affects acceptance of their products. Widely disseminated project information will provide an important opportunity for vendors to demonstrate their product's performance to a broad audience.

Utilities

Multi-megawatt implementation, testing and demonstration of DERs in an actual utility installation will provide real-world evidence that these technologies can be used as reliable utility resources to reduce cost of service, improve system operation, and to offer value-added services to customers.

Regulatory Agencies

DUIT will provide objective, real-world test conditions of DERs that offer significant value to federal, state and utility regulatory agencies, as they move to adopt standards and regulation for interconnection of DERs with the electric distribution system.

Test Program

A key aspect of DUIT is a thorough test of the feasibility and value of co-location and integration of DERs into the electric distribution system. A number of DERs, both generation and storage devices from multiple vendors, are installed within "electrical proximity" to each other so that a variety of electrical interactions may be observed, and operational implications can be evaluated. Commercial-grade "off-the-shelf" DER systems will be tested. These include

- Combustion Turbines
- Controls
- Engines
- Fuel Cells
- Inverters
- Microturbines
- Photovoltaics
- Storage

The collection of DERs will demonstrate the feasibility of remote operations, monitoring and dispatch. Individual DERs will be instrumented to measure interaction with the grid. The gathered data will be analyzed to characterize the impact and actual value of DERs to ratepayers and utilities.

DUIT participation is open to all primary stakeholders, regulators, DER developers and vendors, and utilities. DER vendors, especially, are encouraged to participate as a way to demonstrate the viability of their products.

DUIT Sponsors and Participants

DUIT is a public-private collaboration among DER technology companies, government agencies and utilities. These organizations are contributing equipment, expertise and financing.

Current sponsors and participants include:

- California Energy Commission
- Capstone Microturbines
- Caterpillar
- San Francisco Public Utility Commission
- Cummins Power Generation
- Distributed Utility Associates
- U. S. Department of Energy
- Edison Electric Institute
- ENCORP
- Endecon Engineering
- National Renewable Energy Laboratory (NREL)
- Pacific Gas and Electric Co.
- Sacramento Municipal Utility District (SMUD)
- SMA America
- Solar Turbines
- Texas Public Utility Commission
- Underwriters Laboratories
- Xantrex

DUIT seeks to evaluate a diverse group of DER technologies/products. Vendors targeting the DER market are invited to contact the DUIT team regarding participation.

Learn More about DUIT

To inquire about prospective DUIT project participation, technical specifications, test plans, project plans or the DUIT white paper, please contact the DUIT Project Team.

Contact Information

Susan Horgan
DUIT Project Leader
Distributed Utility Associates
Tel: (925) 447-0625
Email: susan@dua1.com

David Michel
DUIT CEC Contract Manager
PIER-Energy Systems Integration
Tel: (916) 651-9864
Email: dmichel@energy.state.ca.us